

High Quantum Efficiency 1024x1024 Longwave Infrared SLS FPA and Camera, Phase II

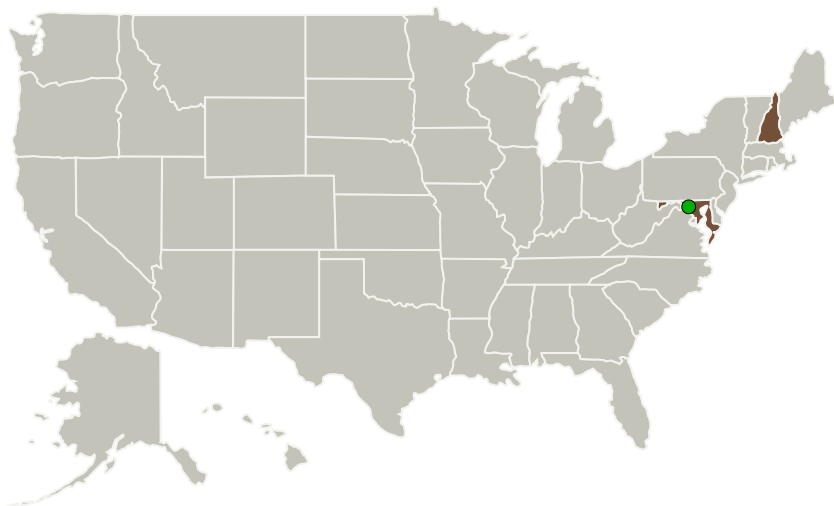
Completed Technology Project (2013 - 2015)



Project Introduction

We propose a high quantum efficiency (QE) 1024x1024 longwave infrared focal plane array (LWIR FPA) and CAMERA with ~ 12 micron cutoff wavelength made from bandgap-engineered Type-II InAs/GaSb strained layer superlattice (SLS) photodiodes. FPA/camera performance goals include QE > 50% and temporal noise equivalent difference in temperature (NEDT) < 30 mK while operating at a temperature > 60K with a fast integration time < 0.5 ms and F/4 optics. In Phase I, we developed and delivered a high-performance 640x512 SLS FPA as proof of concept, clearly demonstrating the viability of bandgap-engineered Group III-V InAs/GaSb/AlSb materials as a real cost-effective alternative to mercury cadmium telluride (MCT) for NASA's requirements for high-QE LWIR FPAs. Phase II will build on Phase I by expanding array format, shrinking pixel pitch, improving QE, and packaging and delivering the FPA in a camera that NASA can field-test to evaluate this novel sensor technology. The 12 micron cutoff, high QE, and relatively high operating temperature of SLS are expected to be of particular benefit to NASA's LANDSAT and HypSIRI projects.

Primary U.S. Work Locations and Key Partners



High Quantum Efficiency
1024x1024 Longwave Infrared
SLS FPA and Camera


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Organizations Performing Work	Role	Type	Location
QmagiQ, LLC	Lead Organization	Industry	Nashua, New Hampshire
 Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations

Maryland	New Hampshire
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Images



Project Image

High Quantum Efficiency
1024x1024 Longwave Infrared SLS
FPA and Camera
(<https://techport.nasa.gov/image/127245>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

QmagiQ, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

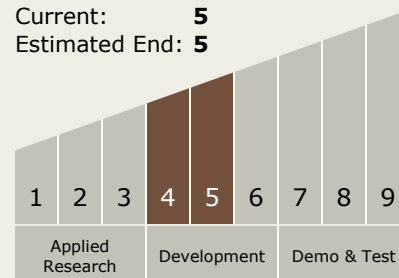
Carlos Torrez

Principal Investigator:

Mani Sundaram

Technology Maturity (TRL)

Start: 4
Current: 5
Estimated End: 5



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Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.1 Remote Sensing Instruments/Sensors
 - └ TX08.1.1 Detectors and Focal Planes

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System